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ANTARCTIC RESEARCH PROGRAMME OF THE FEDERAL REPUBLIC OF GERMANY - SUMMARY

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ANTARCTIC RESEARCH PROGRAMME OF THE FEDERAL REPUBLIC OF GERMANY

SUMMARY

1. In compliance with the decision taken by the Federal Government on 5 October 1978 and by the German Bundestag on 16 November 1978 to seek participation of the Federal Republic of Germany in the consultative meetings under the Antarctic Treaty, the Federal Government adopted the "Antarctic Research Programme of the Federal Republic of Germany" on 12 December 1979, after the instrument of accession of the Federal Republic of Germany to the Antarctic Treaty had been deposited in Washington on 5 February 1979. The aim of the Programme is to conduct substantial scientific research activities in Antarctica, thus following the tradition of German Antarctic research (see Annex) and demonstrating the interest of the Federal Republic of Germany in Antarctica.

2. The Antarctic Research Programme has been prepared in a cooperative effort by the Federal Minister for Research and Technology, the Federal Minister of Economics, the Federal Minister of Food, Agriculture and Forestry, the National Committee on Antarctic Research, the German Research Society, university institutes, Federal and Länder research institutes, institutes of the Max Planck Society as well as German industry. The programme, for which a total of about DM 380 million will be earmarked for the period ending 1983, will concentrate on

○ biological sciences
○ geodesy, cartography and remote sensing
○ geology and geophysics
○ glaciology
○ meteorology and oceanography
○ upper atmosphere and extraterrestrial physics
○ astronomy
○ engineering sciences including iceberg location, exploration and construction techniques as well as shipbuilding technology.

As far as the biological sciences are concerned, the following investigations are proposed among others:

Participation in the BIOMASS programme of studies of the Antarctic ecosystem, with particular emphasis on the food web relationships and the interactions between krill and its food base, the phytoplankton. Studies on the life history and stocks of krill and Antarctic fishes are to be continued and a programme on seals and birds will be initiated giving special attention to the need to maintain and protect a well-balanced Antarctic ecosystem. Biological, chemical and physical oceanographers will jointly investigate the conditions governing primary production and the fate of phytoplankton. Research on the physiological ecology of terrestrial, limnic and marine organisms will concentrate on the biochemical basis of cold adaptions. Taxonomical and biogeographical studies will be continued.

In the field of geosciences the tectonics and rock formations of the Eastern Antarctic Shield as part of the old Gondwana Continent and the structure of younger mountain chains of the West Antarctic will be studied. In the first

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SUMMARY

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Helmut K. Bianchi - GKSS

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years work will focus on the geological features of the environment of the Weddell Sea and on the marine sediments. Relatively little is known about the mass balance of the Filchner/Rønne Ice Shelf, the second largest ice shelf in the world. Its study will be the principal objective of German glaciologists. Detailed analysis of ice core, of ice and sediments, will provide information on palaeo-climatology and palaeo-oceanography. They will be linked with studies on chemistry of water, ice, air and aerosoles and will be related to the global CO_2 budget. The dynamics of the ice masses of the Weddell Sea and their interaction with oceanographic and meteorological phenomena will be analysed by a combination of remote sensing, shipborne observations, recordings of currents and drifts and by numerical models. Further geophysical work will be carried out on the shape and gravity of the earth, terrestrial magnetism and micro earthquakes.

In the fields of extraterrestrial physics of the upper atmosphere and the magnetosphere, the following research is planned i.a.: Study of micrometeorites and cosmic dust; exploration of plasma processes in the magnetosphere of the polar regions; study of low-frequency radio emissions and terrestrial magnetic pulsations; measurement of the vertical distribution of ozone, water vapour and aerosole particles up to an altitude of 30 km.

In the fields of meteorology and oceanography, the programme envisages research into dynamics of the troposphere, the interaction between ice, water and atmosphere in the Weddell Sea, the effects of the polar regions on climatic processes, the circumpolar current system, the behaviour of trace gases, the formation and spread of bottom waters, the heavymetal content of the Antarctic ocean as well as interaction processes in the polar front zone.

Experts in the engineering sciences are interested in problems related to the use of ice as a construction material in Antarctica, ice-breaking techniques for shipping, on-shore and off-shore structures for use under polar conditions, as well as in the transfer of new technologies to other fields of application.

Under the Antarctic Research Programme, the following measures — some of which have already been initiated — are to be carried out:

- ○ construction of a German research station in Antarctica
- ○ building of a polar research and supply ship
- ○ establishment of a German polar research institute at Bremerhaven
- ○ intensification and coordination of polar research at universities and other institutions
- ○ international cooperation
- ○ extensive research expeditions to the Antarctic.

The following are details of the above projects:

3.1 Research station in Antarctica

According to its present design, the German base station will be built on the Filchner/Rønne Ice Shelf west of Berkner Island in the Atlantic region. The station will fit into the chain of Argentine, British and Soviet research stations along the fringe of the ice shelf. It will mainly serve geo-science.

The contract for building the station was awarded in January 1980. Construction of the station is to take place in the austral summer of 1980/81. The preliminary cost estimate is DM 20 million. In order to prepare the site for construction, a field station was built in 1979/80 to serve as a base for the thorough exploration of the site. At the same time this expedition served scientific investigations in the field of marine biology, oceanography, glaciology, geodesy and ice dynamics.

The German research station is designed to be used as both a scientific observatory and a logistic base for field expeditions within a radius of 1,000 km. The station will have living quarters for 30 people. In emergencies, up to 45 scientists and technicians can be accommodated. The station will consist of large, almost elliptic corrugated steel iron tubes protecting the research, residential and machinery buildings from wind, cold and snowdrifts. Within two years, the tubes are expected to be completely covered by drifting snow.

3.2 Polar research and supply ship

The ship-building contract has been awarded in July 1980 to Howaldtswerke — Deutsche Werft, Kiel, and Werft Nobiskrug, Rendsburg. Completion is foreseen for 1982.

The ship will be used for research work in polar regions and will supply the German Antarctic station. In addition, it will be employed for experimental studies in the fields of ship-building, ice-breaking and communication technology. The ship's technical design is determined largely by the requirements of passing through ice, by research needs and by the need to carry up to 1,600 tons of supplies each year to keep the station in operation.

With a length of 117 m, a width of 25 m, a draft of 11 m and an installed engine power of 14,720 kw, it will be the biggest German research vessel. The construction costs are expected to amount to about DM 185 million.

The ship's scientific equipment will include laboratories, workshops, winches and special devices, e.g. for research in the fields of meteorology, geology, geophysics, oceanography, biology and fishery science. Two helicopters can be carried and balloons can be launched. In addition to the regular crew and the scientists and technicians on board, another 26 people can be accommodated for passage to the Antarctic research station. Thus the ship can carry up to 90 persons. In designing the ship, in particular the hull, advanced solutions have been pioneered.

.3 Polar Research Institute

The Institute's scientific functions are in basic research in various fields of polar science. Even more important for polar research in general are the Institute's logistic functions of coordinating and supporting the relevant scientific activities carried out by other institutions in the Federal Republic of Germany. The Institute will assist the German Antarctic research station with its field stations, provide the logistics for the polar expeditions and plan, fix and supervise the missions of the polar research vessel.

The Institute was established in July 1980 at Bremerhaven. It will have four scientific departments and one for technology and logistics. It is planned to staff the Institute with about 45 scientists and 30 persons for technical and clerical work. The Institute was given the status of a foundation under public law of Land Bremen. The costs are expected to amount to about DM 40 million for the establishment of the Institute and up to DM 28 – 30 million per annum for all operations under the aegis of the Institute.

In recognition of the scientific achievements of Professor Alfred Wegener, the German polar explorer who won international fame as a geophysicist and meteorologist and who died in the Greenland ice in 1930, the Institute will be named „Alfred-Wegener-Institut für Polarforschung" (Alfred Wegener Institute for Polar Research).

4 Intensification and coordination of polar research at universities and other institutions

Polar research in the Federal Republic of Germany is centered in a few universities, primarily at Kiel, Munich and Münster, and a number of research institutes, particularly the Federal Institute of Geosciences (Hanover) and for Fishery Research (Hamburg). The Federal Government together with the German Research Society aim to intensify and coordinate those efforts within the logistical framework provided by the Polar Research Institute. The German Research Society plans to establish a special fund for a period of at least five years which would assist individual scientists or small groups of them to carry out research projects particularly in cooperation with foreign institutions.

The coordination of Antarctic research within the Federal Republic of Germany will rest with the German Commission for Polar Research. The National Committee for SCAR will continue to be the link for international cooperation.

International cooperation

The Federal Republic of Germany sees its Antarctic Research Programme as a means of extending the range of opportunities for scientific and technological cooperation with other nations. The Federal Government seeks to promote such cooperation both under the Antarctic Treaty and on a bilateral basis.

4. Plans for 1980/81:

- Construction of the German Antarctic Station.
  Project coordinators: Dorsch Consult, Munich, and Polar Research Institute, Bremerhaven.
- November 1980 — March 1981 an extended expedition by RV "Meteor" in the Scotia Sea for studies in
  a) primary production, physical oceanography and marine chemistry,
  b) sedimentology and benthos,
  c) krill biology, plankton and trace substances.
  16 German and 14 foreign institutions will participate.
- Participation of RV "Walther Herwig" in the FIBEX echo survey and krill patch study in the central Scotia Sea.
- Investigations by marine biologists and fishery biologists into stocks and early life history of fish in the Atlantic sector of Antarctica. (Cooperative venture of the Federal Institute for Fishery Research, Hamburg, and the Institute of Marine Sciences, Kiel.)
- Glaciological, geophysical and meteorological investigations in the region of the Rønne Ice Shelf. Participating: Münster University.
- Individual research work, e.g. in the fields of biology, geology, geophysica, geodesy, glaciology, meteorology, astronomy, oceanography, in cooperation with Argentina, Australia, New Zealand, Norway, the United Kingdom and the USA.

Apart from the personnel of the vessel and for the construction of the Station about 125 German scientists and technicians will be engaged in scientific studies in Antarctica in the season 1980/81.

nnex

German Research Ventures in Antarctica

73/75	Research expedition of E. Dallmann to the West Coast of the Antarctic Peninsula
01-09	First German Antarctic expedition led by E. v. Drygalski explores the region known as Wilhelm II Land
11-13	Second German Antarctic expedition led by W. Filchner and C.W.A. Brennecke explores the Weddell Sea
38-39	Third German Antarctic expedition led by A. Ritscher explores the region known as Neu-Schwabenland
75-76	First German krill expedition
77-78	Second German krill expedition
77/78	Marine geophysical research expedition by the Federal Institute of Geosciences, Hanover, to the Weddell Sea
79/80	Site survey expedition by MV "Polarsirkel" for the German Antarctic station on the Filchner/Rønne Ice shelf — at the same time scientific investigations in the fields of glaciology, biology and oceanography in the Weddell Sea
	Expedition by MV "Schepelsturm" for geophysical, petrological, geological studies in North Victoria Land and in the Ross Sea

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